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EXAMINER

SHEVIN, MARK L

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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05/21/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/578,298	Applicant(s) YONEHANA ET AL.	
	Examiner MARK L. SHEVIN	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on May 4th, 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/03/2006, 05/30/2007, and 07/02/2008</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status

1. Claims 1-8, filed as a preliminary amendment on May 4th, 2006, are pending.

Information Disclosure Statements

2. The information disclosure statements (IDS) submitted August 3rd, 2006, May 30th, 2007, and July 2nd, 2008 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner. Please refer to applicants' copies of the 1449 forms submitted herewith.

Claim Objections

3. **Claims 1-8** are objected to because of the following informalities:

Independent claims 1 and 4 reference heating a starting material of metal chloride and reducing metal chloride "steam." "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, *415 F.3d 1303, 1313<, 75 USPQ2d 1321>, 1326< (Fed. Cir. 2005) (*en banc*) and steam is normally used in reference to water vapor, not the vapor of any other substances.

Independent claim 4 contains a parenthetical phrase "number of alloying components – 1" which should be explicitly stated without parentheses to make

Art Unit: 1793

clear that the metal of the metal chloride becomes alloyed with another metal in the final metal alloy particles.

Appropriate correction is required.

Claims 3 and 7 are objected to as these claims stated that "metal chloride is cupric chloride (CuCl_2), ferric chloride (FeCl_3) but it is not clear whether "metal chloride" is cupric chloride only, or ferric chloride only, or both, or all of three.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1 and 4 reference "super-micro" powder however "super-micro" provides no guidance to a reader of such a claim as to what exactly is being produced by the claimed material and what kind of prior art processes read on "super-micro". Furthermore, there is no definition in the specification as to the term. For the purposes of examination, absolutely any and all size particles produced by a prior art process are deemed to read on "super-micro" in the absence of any explicit size limitation.

Independent claim 2 references the valence of the metal chloride used but is not distinct in stating the numerical limitation. It is not clear what the valence of the metal chloride must be beyond the specific examples of dependent claim 7.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1 and 2** are rejected under 35 U.S.C. 102(b) as being anticipated by **US '356** (US 2,642,356) or **US '357** (US 2,642,357).

Regarding claim 1, US '356 discloses a process for producing very finely divided nickel (col. 1, lines 8-9) by reacting nickel chloride (NiCl_2) with heated hydrogen gas (claim 2) in the range of 475 – 650 °F (246-343 °C) in the presence of pure metallic nickel (claim 1). US '357 is identical to US '356 except that the metal chloride is cobalt chloride (CoCl_2), the metallic catalyst is pure metallic cobalt, and the temperature of the hydrogen gas is 510 – 690 °F (265-366 °C).

The metal chloride material of US '356 and US '357 is heated by contact with contact with the heated hydrogen gas and is the step of "heating a starting material containing a metal chloride" is satisfied. The step of "reducing the resulting metal chloride steam with hydrogen gas to produce super-micro powder of a pure metal" is met by the disclosures of US '356 and US '357 that very-finely divided Ni and Co (respectively) are formed (which reads on super-micro as there is no quantitative size guidance provided) and one would reasonably expect the heated metal chloride to have at least some minimal level of vapor (steam) given the heating by contact with heated hydrogen gas. Elemental metal

Art Unit: 1793

is "mixed" with the metal chloride as the claims of both US '356 and US '357 state that the elemental metals (Ni and Co, respectively) are "in contact" with the metal chlorides.

Regarding claim 2, both NiCl_2 and CoCl_2 have valences of two or larger.

6. **Claims 4-6 and 8** are rejected under 35 U.S.C. 102(b) as being anticipated by **US '193** (US 2,754,193) or **US '195** (US 2,754,195).

US '193:

US '193 discloses a process of making copper-iron alloy powder (col. 1, lines 15-20 and col. 2, lines 20-25) by mixing copper chloride (CuCl_2 or CuCl - col. 3, lines 1-30) together with metallic iron powder (col. 3, lines 45-70), heating the mixed starting materials to between 1000 °F and 1800 °F and passing a reducing gas containing hydrogen over the mixed powders of the starting materials (col. 2, lines 18-31). Example I, col. 5, lines 5-41 best embodies the process of US '193.

US '195

US '195 discloses a process of making copper-iron alloy powder (col. 1, lines 14-19 and col. 2, lines 5-20) by mixing iron chloride (FeCl_3 or FeCl_2 - col. 2, lines 50-63; col. 3, lines 16-42) with metallic copper powder (col. 3, lines 1-15), heating the mixed starting materials to between 1000 °F and 1800 °F and passing a reducing gas containing hydrogen over the mixed powders of the starting materials (col. 2, lines 20-50). Example I, col. 4, lines 45-75 best embodies the process of US '195.

Art Unit: 1793

Regarding claim 4, the step of "heating a starting material containing a metal chloride and reducing the resulting metal chloride steam with hydrogen gas" is met by the disclosures of US '193 and US '195 that Cu-Fe alloy powder is formed (which reads on super-micro as there is no quantitative size guidance provided) and metal chloride steam is reduced as demonstrated in the Examples of US '193 and US '195. From the Examples of both patents, the metal chloride forms one of the alloying elements and the metallic powder the other to give the resultant Cu-Fe alloy powder.

Regarding claim 5, US '193 discloses the use of CuCl_2 as the metal chloride (col. 3, lines 1-30) while US '195 discloses the use of FeCl_3 as the metal chloride (col. 2, lines 50-63; col. 3, lines 16-42).

Regarding claims 6 and 8, US '193 discloses the elemental metal as being iron (col. 3, lines 45-70) while US '195 discloses the elemental metal as being copper (col. 3, lines 1-15).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1793

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Joint Inventors

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Oda** (US 6,432,161).

Oda:

Oda discloses a process for producing niobium or tantalum powder by reducing a niobium or tantalum compound such as niobium pentachloride or niobium subchloride (col. 4, lines 30-41) with a reducing agent (col 3, lines 25-42) such as hydrogen (col. 4, lines 42-45). The halide is preferably a subhalide, which may be produced, for example, by contacting niobium pentachloride gas with niobium metal at a high temperature of 500 °C or more (col. 6, lines 5-20). Furthermore, niobium or tantalum powder may be produced by a gas-phase method where a volatile halide of niobium or tantalum is reduced with hydrogen-containing gas (col. 6, lines 34-45).

Art Unit: 1793

Regarding claim 1, it would have been obvious to one of ordinary skill in metal chloride reduction, at the time of the invention, to reduce a metal chloride mixed with an elemental starting material of the metal chloride to form a powder as Oda discloses producing Nb or Ta powder by reducing volatile halides with hydrogen and that such halides may preferably be subhalides which are produced by contact of, for example, niobium pentachloride with niobium metal (implicitly elemental niobium as it is not bonded in a compound or said to be present as an ion). Motivation to mix niobium metal with niobium pentachloride as a starting material comes from the teaching that reduction of niobium pentachloride to niobium subhalide occurs at elevated temperature and reduction of niobium halides to niobium powder occurs at elevated temperatures, motivating one to combine the reduction to subhalide and reduction to powder into one large reaction to save time and heating costs.

Regarding claim 2, niobium pentachloride has a valence of five, which is in the claimed range.

8. **Claims 1-3 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Otsuka** (US 4,810,285) in view of **Richardson** (H.W. Richardson, "Copper Compounds", in Ullmann's Encyclopedia of Industrial Chemistry, Wiley-VCH Verlag, June 15th, 2000, p. 1-31) and **US '193** (US 2,754,193).

Art Unit: 1793

The disclosure of US '193 was discussed above, however US '193 does not disclose reduction a metal chloride with hydrogen gas in the presence of an elemental metal constituting the metal chloride.

Otsuka:

Otsuka discloses a process for preparing spherical fine (0.1 micron or more) or superfine (less than 0.1 micron) copper powder by reducing cuprous chloride (CuCl) vapor with hydrogen gas at a temperature of 900 to 1150 °C (col. 2, lines 5-25)

Richardson:

Richardson discloses that copper (II) chloride (CuCl_2) is reduced to copper (I) chloride (CuCl) by reacting elemental Cu with CuCl_2 (p. 8, col. 2, para 1 and 2) with 22 kJ/mole of energy released.

Regarding claim 1, it would have been obvious to one of ordinary skill in metal chloride reduction, at the time of the invention, to reduce a metal chloride mixed with an elemental starting material of the metal chloride to form a powder because US '193 teaches that in the reduction of cupric chloride (CuCl_2), cuprous chloride (CuCl) is formed as an intermediate (col. 3, lines 20-30) in the context of reduction in the presence of an elemental metal other than the chloride while Richardson discloses that CuCl_2 is clearly reduced to CuCl by contact with elemental copper, indicating that the intermediate of US '193 is not unique to reduction by an elemental metal of a different type. Otsuka further teaches that reduction of CuCl with hydrogen yields fine copper powder which reads on the super-micro powder of claim 1. Motivation to use an elemental metal constituting

Art Unit: 1793

the metal chloride along with copper (II) chloride comes from the disclosure of US '193 that implicitly teaches that the elemental metal is combined with the metal of the metal chloride in the final product, thus if one desired pure copper powder as in Otsuka, one would choose copper as the elemental metal for reaction with copper chloride because Richardson taught the reduction of cupric chloride to cuprous chloride by using elemental copper.

Regarding claims 2, 3, and 7, it would have been obvious to one of ordinary skill in metal chloride reduction, at the time of the invention, to use cupric chloride (CuCl_2) as the metal chloride as US '193 taught that cupric chloride and cuprous chloride are basically equivalent for the end purpose of forming metal powders as cupric chloride is reduced to cuprous chloride as an intermediate. Thus one would be motivated to substitute the cuprous chloride of Otsuka with cupric chloride for the reasons as taught by US '193.

Conclusion

- Claims 1-8 (All pending) are rejected**
- Claims 1-8 are objected to**
- No claims are allowed**

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision

Art Unit: 1793

is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

May 12th, 2009
10-578,298

/George Wyszomierski/
Primary Examiner
Art Unit 1793